



AMERICAN DOG TICK

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The Connecticut Agricultural Experiment Station

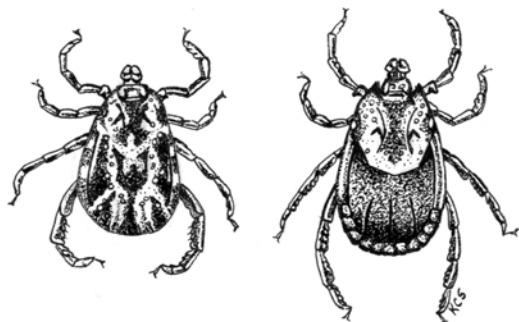
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Information on disease incidence was provided by the Connecticut Department of Public Health

The American dog tick, *Dermacentor variabilis*, is one of the most widely distributed and common ticks in Connecticut. This tick is found throughout the eastern United States. Known by some people as the wood tick, only adults of the American dog tick are usually found feeding on people and their pets. The American dog tick can transmit the organism that causes Rocky Mountain spotted fever, but this disease is not common in Connecticut. The tick does not transmit the Lyme disease bacterium, *Borrelia burgdorferi*. Additional information is available from Experiment Station fact sheets on *Tick Associated Diseases*, *Ticks*, *Tick Bite Prevention*, and *Tick Control*.

DESCRIPTION

Adult American dog ticks are reddish brown in color with white markings on the back or upper body. They are about 1/4 of an inch long. Female ticks increase dramatically in size as they obtain their blood meal from a host animal. Fully engorged females may reach 1/2 inch in length and resemble a dark pinto bean. Male ticks do not change in size as they feed.



Color inset: Female American dog tick (courtesy Pfizer Central Research). Above: Male (left) and Female (right) American dog ticks (Kirby Stafford).

LIFE CYCLE

Ticks require blood from vertebrate animals to complete their life cycle. However, they can live for extended periods, if suitable hosts are not available. The maximum survival time for an unfed adult dog tick is about 1,000 days. The four stages in the tick life cycle are the egg, larva, nymph, and adult (male and female). Larvae and nymphs of the American dog tick feed on meadow voles (*Microtus pennsylvanicus*), white-footed



mice (*Peromyscus leucopus*), and other rodents. Dogs are the preferred hosts of adult ticks, but they also feed readily on other medium to large mammals. These include opossums, raccoons, skunks, fox, coyote, bobcat, squirrel, cattle, sheep, horses and people. Adults become active around mid-April to early May and remain a nuisance until August. Dog ticks climb up grass or other vegetation to grasp a passing host; they cannot fly or jump. A female tick will feed for 10-12 days. Once she is

engorged with blood, she drops off the host, lays 4,000 to 6,500 eggs or more, and dies. Males ingest smaller amounts of blood from hosts. In Connecticut, the American dog tick probably requires 2 years to complete its life cycle.

TICK HABITAT

American dog ticks are most numerous along roadsides, paths, marshy areas and trails in brushy woodlands or meadows with tall grass or weeds. Meadow voles are found in fields, pastures, fresh and saltwater marshes, meadows, borders of streams and lakes, and open or wooded swamps. Consequently, large numbers of these ticks may be encountered in those areas. People or their pets may bring these ticks from outdoors into the home.

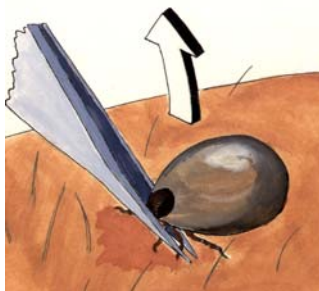
TICK BITE PREVENTION MEASURES

Avoid tick-infested areas during the peak season of adult dog tick activity – May through August. Wear light-colored clothing with the pants tucked into socks. On returning home, remove and wash the clothing. Carefully inspect the body and, by using tweezers, remove any attached ticks. Also, carefully inspect children and pets (Photo courtesy Pfizer Central Research).



Dog ticks seem to prefer certain areas of the host. Although these ticks may feed anywhere on a dog, examine carefully the area between the toes, under the legs, around the ears, and in deep folds of the skin. On children, all parts of the body should be examined, particularly the nape of the neck.

Tick removal – The mouthparts of an American dog tick are short and do not penetrate deeply into the skin. These ticks secrete a cement-like substance around the mouthparts and on the skin to help the tick hold tightly onto the host. Use thin-tipped tweezers or forceps to grasp the tick as close to the skin surface as possible. Pull the tick straight upward with steady even pressure. This usually removes the tick with the mouthparts attached. Disinfect the area with rubbing alcohol and apply a topical antibiotic. If kept for reference, store the tick in a small jar of alcohol. Contaminated tick tissues can transmit spotted fever organisms. Therefore, do not crush the tick or remove it with unprotected fingers.



Repellents – The primary active ingredient in most insect/tick repellents today is DEET (N,N-diethyl-3-methylbenzamide or N,N-diethyl-m-toluamide). DEET is the most effective, broad-spectrum repellent ever discovered. The U.S. Environmental Protection Agency (EPA) estimates that over one-third of the U.S. population will use a DEET-based product. There are approximately 230 products from 70 companies containing DEET. Products range in concentration from 4% to 100% DEET and are available as an aerosol can, pump spray bottle, stick, lotion, cream, or towelette for application to skin or clothing. DEET is only effective for one to several hours and must be reapplied periodically. The effectiveness of DEET on the skin is influenced by the concentration of DEET, absorption through the skin, evaporation, sweating, air temperature, wind, and abrasion of the treated surface by rubbing or washing. Higher concentrations generally provide longer protection. Increasing the concentration does not provide a proportional increase in protection time. Several controlled-release, extended duration products with DEET have been developed which decrease skin absorption and increase protection time. All active ingredients and their concentrations are listed on the product label.

DEET and ticks: DEET will repel ticks and decrease the chances of tick bite, but depending upon the concentration, it may not provide total protection.

Concentrations of DEET that might prevent tick attachment may not deter a tick from walking across the skin to unexposed and untreated areas. For ticks, DEET concentrations around 20 to 30% applied to clothes are about 86-92% effective in preventing tick bites. When applying a repellent against ticks, particular attention should be given to the shoe tops, socks, and lower portion of pants.

Safe Use of DEET: The Environmental Protection Agency (EPA) completed a review of DEET and concluded that normal use of DEET does not present a health concern to the general population when following label directions. The EPA established new labeling requirements for directions, precautions, and claims. For example, child safe claims for low concentration DEET products are no longer allowed. The EPA is requiring changes to the label to ensure the safe use of DEET, particularly on children.

DEET has been used by millions of Americans for 40 years and the incidence of adverse reactions is low. However, some allergic, toxic, and neurological reactions to DEET have been reported in medical literature. Repeated applications have occasionally produced tingling, mild irritation or contact dermatitis. Some individuals may be particularly sensitive to chemicals. Toxic encephalopathic reactions are rare, but have occurred with applications to the skin, particularly with children. Reported cases involved high concentrations of DEET and over application of product contrary to label directions. Therefore, it is prudent to minimize the use of high concentrations on the skin and follow the directions and precautions given on the repellent label. The American Academy of Pediatrics recommends 10% or less DEET in repellents used on children. People with certain skin conditions should be cautious about the use of DEET. Apply DEET sparingly to exposed skin, and spray on clothing when possible. However, DEET will harm some synthetic fabrics (rayon and spandex), plastics (watch crystals and eyeglass frames), and car and furniture finishes. If you suspect a reaction to DEET (or any other repellent), stop using the product, wash the treated skin, and call the poison control center (CT 1-800-343-2722).

Permethrin: Several products contain 0.5% permethrin (e.g. *Duranon Tick Repellent*, *Repel Permanone*, *Cutter Outdoorsman Gear Guard*, *Permethrin Tick Repellent*), which is for use only on clothing or other fabrics such as mosquito netting or tents. A synthetic pyrethroid insecticide rather than a true repellent, permethrin works primarily by killing ticks on contact with the clothes and can provide high levels of protection against tick bites (and mosquitoes). Permethrin is available as a 0.5% aerosol spray, and may be bought at lawn and garden centers or sports stores. Permethrin has low mammalian toxicity, is poorly absorbed through

the skin and is rapidly neutralized by the body. Skin reactions are uncommon.

Medical and safety information about the active ingredients in an insect repellent is available from:

National Pesticide Telecommunications Network (NPTN) by telephone (1-800-858-7378) from 6:30 a.m. to 4:30 p.m. Pacific Standard Time or 9:30 a.m. to 7:30 p.m. Eastern Standard Time.

TICK CONTROL

Altering the landscape to increase sunlight, lower humidity and reduce overgrown vegetation can reduce tick populations. Rodent hosts of these ticks will also be discouraged. Close-cut sunny lawns do appear to have fewer ticks. Tick populations can be reduced by:

- Regularly mowing the lawn and other grassy areas (especially near the home and pathways).
- Pruning trees.
- Removing accumulated leaf litter.
- Clearing underbrush in woodlots.
- Cutting down weeds.
- Clearing brush along edges of the lawn, stonewalls, and driveways.
- Treating or protecting domestic dogs.
- Applying an approved acaricide (a pesticide or insecticide that kill ticks) to the vegetation.

Acaricides (pesticides) may be applied to kill adult ticks on lawns, paths, and at grassy or woodland edges. Lawn care professionals or arborists licensed for ground applications can be hired to control ticks in the yard. Many pesticides are restricted to use by licensed pesticide applicators, but some products are available to homeowners. Check the pesticide label to see if a particular product is registered for use against ticks.

Pesticide labels provide information on the active chemical ingredients, formulation, pests and sites for which they can be legally used. They also provide directions for use, precautions, hazards to humans, wildlife and the environment, and first aid instructions. **Always read and follow pesticide label directions and precautions.** Additional toxicological and environmental information is available from the National Pesticide Telecommunications Network, (860) 858-7378 or from internet sites (i.e. www.epa.gov/pesticides or the Extension Toxicology Network) and books.

The time to begin a spray application to control adult American dog ticks would be late April. Wooded or grassy areas adjacent to the home should be treated for maximum effectiveness. These chemicals are highly toxic to fish and other aquatic organisms and application to or near water should be avoided. Most are also toxic to bees and other beneficial insects. Most pyrethroid insecticides bind tightly to soil with little potential for contamination of well or ground water. Trace amounts of the

organophosphate insecticides chlorpyrifos (Dursban) and diazinon have been found in residential wells.

The EPA has announced the phase-out of indoor, residential lawn and garden, and some other uses of chlorpyrifos and diazinon. The ban on the use of chlorpyrifos for indoor, home lawn, outdoor, and non-residential areas where there are children will take effect on December 31, 2001. Sales to retailers for residential lawn use of diazinon will stop August 31, 2003 with registration canceled December 31, 2004

Acaricides registered for the control of ticks in Connecticut include the following chemicals.

- **Bifenthrin** (Talstar). Chemical class: pyrethroid. A restricted use pesticide that can only be used by licensed applicators. Available as a spray or granule.
- **Carbaryl** (Sevin, other brands). Chemical class: carbamate. A commonly used garden insecticide. Available as a spray or granule for ticks on turf and recreational areas.
- **Cyfluthrin** (Tempo, other brands). Chemical class: pyrethroid. For commercial licensed applicator use only. Chemical popular with most commercial applicators.
- **Deltramethrin** (Suspend, DeltaGard G). Chemical class: pyrethroid. For licensed applicator use only. Available as a spray or granule.
- **esfenvalerate** (Zema Lawn Spray, other brands). Chemical class: pyrethroid. This product is a hose sprayer kit for homeowner use and may be used against ticks on lawns and backyards.
- **Fluvalinate** (Mavrik Aquaflo, Yardex). Chemical class: pyrethroid. Labeled for tick control on turf and ornamentals.
- **lambda-cyhalothrin** (Scimitar). Chemical class: pyrethroid. A restricted use pesticide that can only be used by licensed applicators.
- **Permethrin** (Permethrin, Tick Off, Astro). Chemical class: synthetic pyrethroid. Tick Off is a ready to spray product with a garden hose adapter.
- **Pyrethrin**. (Pyrenone, Kicker, Organic Solutions All Crop Commercial & Agricultural Multipurpose Insecticide) Pyrethrins are natural insecticides derived from the chrysanthemum flower. They are often combined with the synergist piperonyl butoxide (PBO), which increases the killing power of pyrethrin. Natural pyrethrin is toxic to aquatic life and bees. There is little residual life with pyrethrin. Pyrethrin with insecticidal soap or PBO is not very effective against ticks, but these materials have not been well evaluated against the American dog tick. Pyrethrin and PBO with either insecticidal soap or silicon dioxide (diatomaceous earth) was found effective against *Ixodes scapularis* (deer) ticks when applied with a hydraulic sprayer. Silicon dioxide works mechanically through abrasion and desiccation and may provide some residual effect.

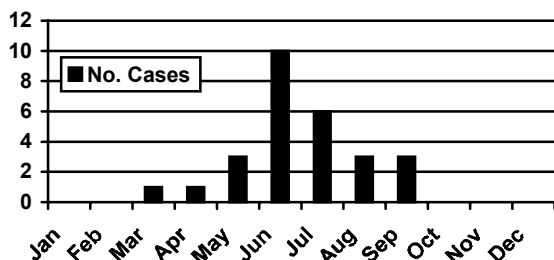
TICK SAMPLING

To determine what places are infested with ticks, attach one side of a 36 inch square piece of white flannel to a pole (broom handle) with a rope tied to the ends of the pole. Drag the flannel over vegetation. Ticks on the flannel can help indicate infested areas.

TICK-ASSOCIATED DISEASES

The American dog tick carries and can transmit several disease pathogens, including Rocky Mountain spotted fever and tularemia. This tick can also cause paralysis in people and dogs.

Rocky Mountain Spotted Fever - Rocky Mountain spotted fever (RMSF), caused by *Rickettsia rickettsii*, is rare in Connecticut. This disease occurs throughout the United States, but most cases of RMSF occur in the South Atlantic and West Central states. The majority of RMSF cases are associated with the bite of the American dog tick. In the western U.S., the Rocky Mountain wood tick, *D. andersoni* is the vector. Station scientists found that less than 1% of 3,000 American dog ticks examined in Connecticut had the spotted fever-group organisms. Not all spotted fever group rickettsiae are infectious to humans. Between 1983 and 1993, 27 human cases were reported to the Connecticut Department of Public Health. Seventy percent of these cases were in Fairfield and New Haven counties. Between 1994 and 1999, an additional 21 cases were reported.



Reported RMSF cases by the month of onset in Connecticut, 1983-1993. Data used with permission by Connecticut Epidemiologist.

Symptoms usually appear within 2 to 9 days after a tick bite. Symptoms include sudden fever (90% of 1989 cases), headache (89% of cases), muscle pain (83% of cases), and rash (78% of cases). The rash is noticed 2-4 days after illness begins and may include the palms (50% of cases) and soles of the feet. Prompt antibiotic treatment with tetracycline, doxycycline, or chloramphenicol for suspected cases of RMSF is important because it can be fatal in 15-20% of untreated cases. Delays in diagnosis because of the absence of the rash or no knowledge of a tick bite could be serious. In recent years, about 1-4% of cases in the U.S. have been fatal. A clinical diagnosis may be confirmed by antibody (blood) tests.

Tularemia (rabbit fever) - The bacterium, *Francisella tularensis*, that causes tularemia is transmitted mainly by the bite of several species of ticks and contact with infected animals. The disease may be contracted while handling dead infected animals (i.e. skinning infected rabbits, hence the name rabbit fever), eating undercooked, infected meat, bites of infected animals, drinking contaminated water, inhalation of contaminated dust, contact with other contaminated materials, or the bite of some deer flies and horse flies. This disease occurs throughout the United States. Most cases have been reported from the central states of Missouri, Arkansas, and Oklahoma. The number of cases has declined over the past several decades. An average of 146 cases was reported annually from 1990 to 1994. This was the last year national records were kept, although reporting has been recently reinstated. Reports of this disease are not common in New England. There were 2 cases reported from New York (Long Island) in 1993. In 1994, there were 2 cases reported from New York and 1 from Massachusetts.

Ticks associated with tularemia are the American dog tick, *D. variabilis*; lone star tick, *A. americanum*; and Rocky Mountain wood tick, *D. andersoni*. Most cases occur during the summer (May-September) and are associated with tick bites.

The clinical symptoms of tularemia depend upon the means of infection. With infection by tick bite, an ulcer often occurs at the site of the bite with possible swelling of the regional lymph nodes. Fever is the most commonly reported symptom. Diagnosis can be confirmed by an antibody test. Streptomycin or gentamicin is used for the treatment of tularemia. While tetracycline or chloramphenicol may also be used, they are less effective and relapses occur more frequently.

Tick Paralysis - The feeding by certain *Dermacentor* ticks can cause a progressive paralysis, which is reversed upon removal of the tick. Recovery is usually complete. The paralysis is not caused by a disease pathogen, but by a toxin produced by the tick. Paralysis begins in the extremities with a loss of coordination. It progresses to the face with corresponding slurred speech, and finally shallow, irregular breathing. Failure to remove the tick can result in death by respiratory failure. Most cases of tick paralysis are caused by the Rocky Mountain wood tick (*Dermacentor andersoni*) in northwestern states, but the American dog tick has also been known to cause tick paralysis.

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